Chapter 2
Hydrologic Conditions, 2001-2002

Introduction

Hydrologic conditions are typically discussed using "water years", which begin on October 1 of one calendar year and end on September 30 of the following year. The January 2001 through December 2002 chronological period covered by this report includes parts of three water years, i.e., the last nine months of water year 2001 (January 2001 through September 2001), the entire twelve months of water year 2002 (October 2001 through September 2002), and the first three months of water year 2003 (October 2002 through December 2002). In order to concisely describe hydraulic conditions in the Bay-Delta during this period, this chapter will discuss water years 2001 through 2002 (October 2001 through September 2002) unless otherwise noted.

Methods

Water years are classified in this report using two indices: the Sacramento Valley 40-30-30 Water Year Hydrologic Classification Index[1,2] (Sacramento Valley Index), and the San Joaquin Valley 60-20-20 Water Year Hydrologic Classification Index[3,4] (San Joaquin Valley Index) (SWRCB 1999). The Sacramento Valley Index is used to characterize water years statewide because most precipitation falls in the northern half of California, and much of that precipitation flows through the San Francisco Estuary (SWRCB 1999). The San Joaquin Valley Index is used predominantly for regional applications; however, this index provides supporting information concerning water conditions within the San Joaquin Valley. According to both indices[5,6] water years 2001 and 2002 were classified as "Dry."

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[1] The Sacramento Valley 40-30-30 Water Year Hydrological Classification Index is equal to 0.4 X current April to July unimpaired runoff + 0.3 X current October to March unimpaired runoff + 0.3 X previous year's index (if the previous year's index exceeds 10.0, then 10.0 is used).

[2] Sacramento River unimpaired runoff is the sum of Sacramento River flow at Bend Bridge, Feather River flow to Lake Oroville, Yuba River flow at Smartville and American River flow to Folsom Lake (SWRCB 1999).

[3] The San Joaquin Valley 60-20-20 Water Year Hydrological Classification Index is equal to 0.6 X current April to July unimpaired runoff + 0.2 X current October to March unimpaired runoff + 0.2 X previous year's index (if the previous year's index exceeds 4.5, then 4.5 is used).

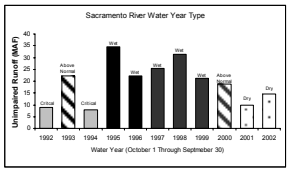
[4] San Joaquin River unimpaired runoff is the sum of Stanislaus River inflow to New Melones Lake, Tuolumne River inflow to New Don Pedro Reservoir, Merced River inflow to Lake McClure, and San Joaquin River inflow to Millerton Lake.

[5] Using the Sacramento Valley Index, water years are defined as follows: (1) a "Wet" year occurs when the Index is equal to or greater than 9.2; (2) an "Above Normal" year occurs when the Index greater than 7.8 but less than 9.2; (3) a "Below Normal" year occurs when the Index is greater than 6.5 but equal to or less than 7.8; (4) a "Dry" year occurs when the Index is greater than 5.4 but equal to or less than 6.5; and, (5) a "Critical" year occurs when the Index is equal to or less than 5.0 (SWRCB 1999).

[6] Using the San Joaquin Valley Index, water years are defined as follows: (1) a "Wet" year occurs when the Index is equal to or greater than 3.8; (2) an "Above Normal" year occurs when the Index greater than 3.1 but less than 3.8; (3) a "Below Normal" year occurs when the Index is greater than 2.5 but equal to or

Summary

The "Dry" conditions indicated by the water year indices are in contrast to recent hydraulic conditions which have been designated as "Wet" or "Above Normal" since water year 1995. Figure 2-1 shows unimpaired runoff, and water year designation for Sacramento and San Joaquin rivers for water years 2001 and 2002, and compares them to historical conditions. Unimpaired runoff was low due to the below normal precipitation, reservoir storage and snow pack water content, for both water years (CDEC 2002). Statewide figures for precipitation, runoff, reservoir storage, and snowpack water content as of May 1 of each water year are summarized in Table 2-1.



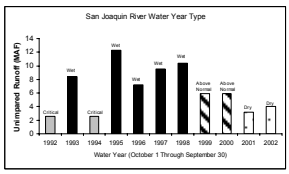


Figure 2-1 Sacramento and San Joaquin Valley unimpaired flow from 1992 through 2002, with water year designation. Values given in million acre-feet (MAF)

Table 2-1 Summary of the major hydrological characteristics of water years 2001 and 2002

	(Percent of normal)			
Water year	Precipitation	Seasonal runoff	Reservoir storage	Snow water content
2001	75	45	100	65
2002	80	80	100	60

Water year 2002 had the highest unimpaired runoff of the study period, with a value of 14.59 million-acre-feet in the Sacramento Valley River Basin and 4.06 million-acre-feet in the San Joaquin Valley River Basin. Table 2-2 summarizes streamflow conditions in these rivers during water years 2001 and 2002.

Table 2-2 Average Sacramento and San Joaquin River streamflow for water years 2001 and 2002

	Average streamflow (in million acre-feet)		
Year	Oct 1–Mar 30	Apr 1–Jul 30	Whole year
Sacramento River			
2001	5.63	3.46	9.81
2002	9.3	4.56	14.59
San Joaquin River			
2001	0.92	2.23	3.18
2002	1.27	2.74	4.06

less than 3.1; (4) a "Dry" year occurs when the Index is greater than 2.1 but equal to or less than 2.5; and, (5) a "Critical" year occurs when the Index is equal to or less than 2.1 (SWRCB 1999).

The Net Delta Outflow (NDO) from the San Francisco Estuary for water year 1999 through water year 2002 is shown in Figure 2-2. This NDO is an estimate of average daily outflow at Chipps Island, and is calculated as:

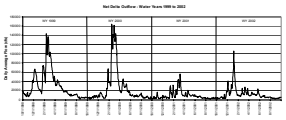


Figure 2-2 Net Delta outflow–average daily flow from water year 1999 through water year 2002

$$\mathbf{NDO = QTot + QPrecp – QGcd – Qmisdv}$$

Where:

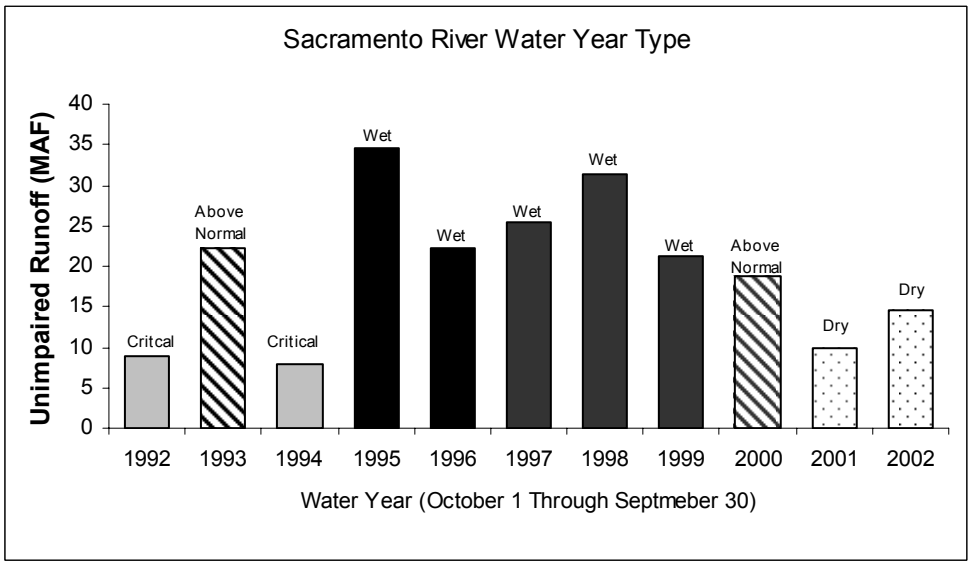
NDO	=	Net delta outflow (cfs)
QTot	=	Total delta inflow (cfs)
QPrecp	=	Total precipitation runoff (cfs)
QGcd	=	Total consumption in delta (cfs)
QMisdv	=	Total flooded island and island storage diversions (cfs)

References

[CDEC] California Data Exchange Center. 2002. Available online at http://cdec.water.ca.gov. Department of Water Resources Cooperative Snow Surveys.

[SWRCB] State Water Resources Control Board. 1999. Water Rights Decision 1641 for the Sacramento-San Joaquin Delta and Suisun Marsh. Sacramento, California.

Figure 2-1 Sacramento and San Joaquin Valley unimpaired flow from 1992 through 2002, with water year designation. Values given in million acre-feet (MAF)



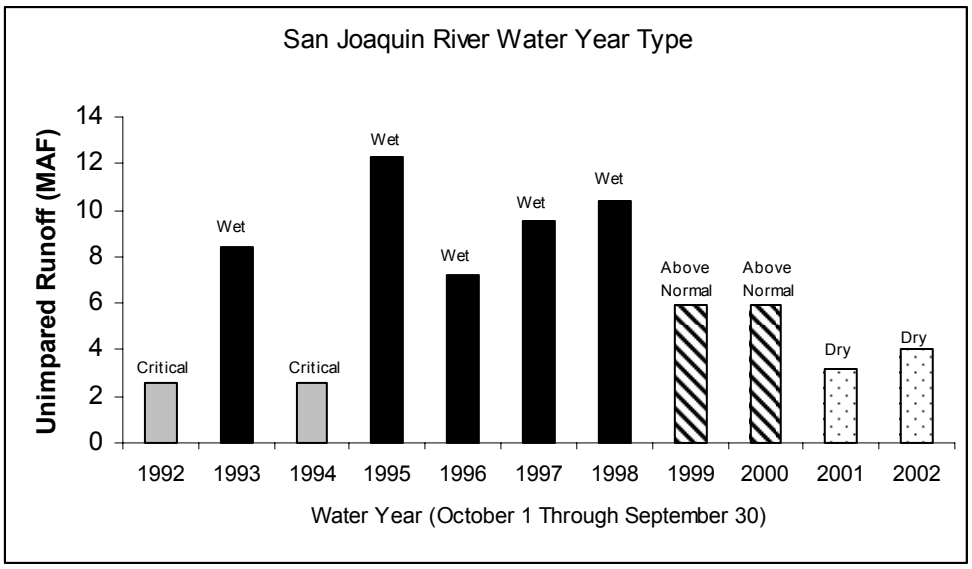


Figure 2-2 Net Delta outflow—average daily flow from water year 1999 through water year 2002